

## Two Temporal Single System Interpretation of Marx Calculations of the MELT

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Far too often articles concerning the Temporal Single System Interpretation (TSSI) of Marx simply attempt to dismiss this interpretation of Marx, which frees his value theory from false allegations of inconsistency and redundancy, on the spurious grounds of its difference to ‘Marxist’ approaches that are influenced by the methods of ‘mainstream’ economics, such as simultaneous calculation of prices and values. As, sadly, critics of the TSSI outnumber its supporters, most journals insist that articles supporting the TSSI should follow/address the agenda of the TSSI’s critics. This ‘non-debate’ has held back attempts to explore the TSSI. In Potts (2011a) I noted for the first time that there is a difference between Kliman’s and Freeman’s methods of valuing commodities in the presence of stocks of commodities. I concluded that this difference of approach indicates how research informed by the TSSI of Marx is not a matter of following a particular dogma, but rather is an open and exciting route to attempting to apply Marx’s analysis of capitalism to understanding the world today. Potts (2011a) is not widely known as the electronic journal *Critique of Political Economy*, sadly, did not continue beyond its first issue. So in this article I shall repeat my analysis, focusing on how Freeman’s and Kliman’s different methods lead to different calculations of the monetary expression of labour-time (MELT).

Keywords: Marx, Value-theory, TSSI, MELT, Stocks.

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## I. Introduction

In my opinion in recent years debate on Marx's value theory has been both exciting and disappointing. Exciting because of the TSSI's 'rediscovery' of the consistency of Marx's value theory (see notably Kliman, 2007). So I'm excited, but why am I also disappointed? I did not expect all Marxist/radical economists to immediately drop everything and start employing the TSSI of Marx. But equally I did not expect Marxist economists, on the purely spurious grounds of the TSSI's difference to their own approaches, to try to completely deny the validity/internal consistency of this alternative interpretation of Marx. The debate between Kliman and Freeman, supporting the TSSI, and Mohun and Veneziani, against the TSSI, over which interpretations of Marx satisfy the Fundamental Marxist Theorem (FMT, see Morishima, 1973) in *Capital & Class*, and subsequently *Marxism 21*, is a good example of this non-academic practice (see Potts and Kliman, 2015, which reproduces all the articles in this debate).<sup>1)</sup> For example Mohun and Veneziani repeatedly claim that the TSSI's concept of the MELT is 'undefined', but Freeman and Kliman (2008) pages 112-113 (note the last sentence in square brackets is footnote 8 which appears at this point) explain that,

The real issue seems to be not that the *concept* of the temporalist MELT is "undefined", but that its *numerical value* is supposedly subject to an "infinite regress" (Mohun and Veneziani 2007: 142), since the input MELT of one peri-

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1) Another extreme example is Sinha's (2009) review of Kliman (2007), which simply focuses on warning readers to not consider at all this worthless approach, that has nothing to do with how 'Marxist' economics is 'conventionally' practised (see Potts, 2014).

od is the output MELT of the previous period, which in turn depends upon the input MELT of that period. ... As Kliman (2007: 155, n10) has recently noted in a similar context, “Anyone who agrees with this objection must, to be consistent, object to the notion that the physical inputs of one period depend upon the physical outputs of the previous period, which in turn depend upon the physical inputs of that period ...”. If Mohun and Veneziani wish to renounce the physical quantities approach they currently embrace because of this “infinite regress” and the fact that inputs and outputs are “undefined” (i.e. their magnitudes are determined temporally), we certainly have no objection. [The whole of Mohun and Veneziani’s objection, in fact, reduces to a refusal to accept an exceptionally standard procedure in any science that makes use of difference or differential calculus — namely the introduction of an initial condition. It is a measure of the obscurity and isolation from all other sciences that the simultaneous approach has introduced into economics that our procedure is still treated by some economic writers as questionable.]

So I think it is time for radical economists to be more academic i.e. to recognise that a consistent interpretation of Marx’s value theory does exist,<sup>2)</sup> and that research employing this method is in its infancy. At the very least the TSSI of Marx may identify interesting new questions/problems/concepts that other approaches may find helpful to develop in their own directions. As I shall explain below the concept of the MELT is such a key finding.

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2) Students should be taught a wide range of Marxist economics, as it is they who will ultimately decide if the study of value theory has a future at all (see Kliman, 2010 and Freeman, 2010 on the state of study into Marx’s value theory).

## 2. Why the MELT Is a Key Finding In Economics

Quite simply in macroeconomics money is either entirely a ‘do nothing’ or a ‘do everything’ concept. I first became an economics student at the time of the rational expectations ‘capture’ of the mainstream (1980’s). In these equilibrium models there was no room for money, or the profit rate and even the interest rate was not obviously evident. Banks, lending to firms, credit between firms were all likewise absent, indeed firms were absent themselves, replaced by identical agents. Money had to arrive unforeseen like a thief in the night for it to do anything to temporarily distort these equilibrium systems. The equilibrium rests on equilibrium relative prices, not in terms of money, but the exchange ratio relations between commodities — one table equals four chairs. This ‘physical’ concept of value leaves no role for money, although, like any single feature of the real world, you can add it to the model to disrupt it, and blame its behaviour for the problems (like blaming workers for any unemployment when unions are added), but money plays no essential part in the model, its neutrality could not be deeper.<sup>3)</sup>

In complete contrast, for example, Post-Keynesian and Circuitist economists have a ‘do everything’ concept of money (Deleplace and Nell, 1996). Money, in the form of credit, is completely key to keeping demand balanced at its highest possible level between the start and end of their circular periods, with fulfilment of this task dependent on a wise and powerful Central Bank/Government. But here money is the only story, or more precisely it is a ‘demand is everything’ concept of money.

As Grossman (1977) reminds us Marx’s value theory encompasses both the really existing physical use-value side of the economy and its valor-

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3) It must be said that Marxist/Sraffian economics shares this essentially ‘physical’ approach (Steedman, 1977), so too does not need money to find its equilibrium.

isation process, with money not being an add-on to the process of the creation of value, rather it is absolutely essential to how value is created and distributed.

But let us be clear, we are not talking about simultaneous and dualistic interpretations of Marx in the tradition of Bortkiewicz (1952 and 1984). In their dual world they have a system of commodities' values in labour-time, their produced values, and a separate system of commodities' 'prices' (relative prices), their appropriated values, with money simply being the numeraire/bridge between the separate systems. Furthermore that bridge is imperfect/unsound, as if the numeraire is set so total profit equals total surplus-value, the total price of commodities does not equal the total produced value of those commodities, and vice versa if the total price of commodities does equal the total produced value of commodities, total profit does not equal total surplus-value (with in either case the aggregate profit rate based on profit in money not equalling the aggregate profit rate based on surplus-value). In sharp contrast the TSSI fulfils all three of Marx's aggregate equalities (Kliman, 2007: Chapter 9). We should also note that TSSI models do not, like the simultaneous and dualistic interpretations of Marx, need to assume equilibrium/equalised profit rates to determine produced and appropriated values. Following the TSSI we can determine produced and appropriated values whether we assume the economy is in equilibrium with equalised profit rates or if it is in disequilibrium with uneven profit rates. Finally we should also note that following a simultaneous and dualistic interpretation of Marx commodities' produced and appropriated values may differ (once adjusted by the numeraire, as they are in different units), but as they are simultaneously calculated they are the same at both the start and the end of the period.

It is within the TSSI of Marx's sequential and non-dualistic approach that money has a central role in the creation and distribution of value. In this sin-

gle, not dual, system values can always be expressed in either unit, hours of labour-time or units of money, as both units are simply expressions of the same thing, labour-time. Ramos-Martínez (2004) developed the concept of the monetary expression of labour-time (MELT) to focus on this novel in economics recognition of money's role in the creation and distribution of value.

To abstractly illustrate the passing of time the TSSI of Marx assumes that production periods, for simplicity separated by instantaneous periods of circulation of commodities, take time, as illustrated by the potential for the unit value of outputs to differ from the unit value of inputs. At the end of the production period prices of commodities, their appropriated values are established. These values may differ from the commodities' produced values (to tend to equalise profitability, and for any other particular vagaries in supply or demand or existence of monopoly prices) which are also established at the end of production. Money is absolutely essential for this variation to occur, as it is the form of expression of appropriated values. MELT, to be precise the MELT established at the end of production with price formation,<sup>4)</sup>

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- 4) The TSSI thus sees the sequence of determination to be from prices to MELT. At this level of abstraction the question of how prices are determined is not the focus of attention. If we alternatively interpreted Marx as assuming that nominal prices are determined by the value of a commodity money, then we would use MELT, itself determined by the value of that commodity money, to find price. If, as in *Capital* Volume One, we assumed appropriated values equal produced values, then commodities' prices would simply equal their produced values in hours multiplied by MELT. Alternatively, as in *Capital* Volume Three Chapter 9, if we assumed profit rates equalised, then commodities' prices would equal their cost price in hours multiplied by one plus the aggregate profit rate, then multiplied by MELT. In either case appropriated values are not determining the total level of surplus-value, rather the total level of surplus-value is determined by the total level of surplus-value extracted from living labour in production (that is total living labour worked minus the value of variable capital, which in TSSI models is given by the wages paid at the start of the pe-

allows us to either express produced values in money so they can be compared to appropriated values in monetary expression (their nominal prices), or to express appropriated values in hours of labour-time so they can be compared to produced values in hours of labour-time. The MELT is determined by the total monetary expression of commodities' appropriated values divided by the total produced value of these commodities in hours of labour-time (with, as we shall explore below, the difference between Kliman's and Freeman's approaches to valuation being which commodities to include in these totals).

This period's produced values will depend on the constant capital consumed in production plus the living labour added. The value of the consumed constant capital is not the produced value of these commodities at the end of the last period, when they were produced and then sold in circulation for this period. These commodities, like all commodities are sold at their appropriated value, not their produced value. At the end of last period commodities' appropriated values, established at the end of production last period at the same time as their produced values, 'superseded' their produced values, re-defining their value, with this value being the value consumed if

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riod divided by the MELT holding at that point). Price/appropriated value formation now redistributes this already established in production total surplus-value, without altering its total quantity i.e. satisfying Marx's central proposition that surplus-value is the 'exclusive source of profit' (Marx, 1976: 270). Outside of these two special cases, in disequilibrium with uneven profitability and appropriated values differing from produced values, if we still assume MELT is determined by the value of a commodity money, then the total appropriated value of commodities in money must equal their total produced value in hours multiplied by MELT. We would have a different set of prices for each distribution of profit rates we assumed. So even if we assume MELT is determined by the value of a commodity money then it is not purely MELT that would determine commodities' prices, rather it would be the MELT plus the distribution of profit rates we assumed.

the commodities act as constant capital input this period. Prices at the end of last period thus re-defined the value of inputs of constant capital employed this period i.e. money is vital. So to establish the value of inputs of constant capital in terms of hours of labour-time we need to divide the monetary expression of their appropriated value at the end of production last period, their prices, by the MELT holding at the end of production last period, which continues to hold at the start of production this period. To this value of constant capital living labour is added to form new produced values by the end of production. Again at the end of production this period a multitude of factors will determine commodities prices, money will again allow appropriated values to deviate from produced values, with the MELT established at the end of production allowing us to compare these values in either money or hours of labour-time.

The TSSI's concept of MELT moves us beyond 'real terms' being a physically defined concept i.e. the idea that the value of money is constant if commodities' prices remain constant. Prices could remain constant, but technological change could reduce produced values and appropriated values (that must equal each other in aggregate for the economy), so total value in monetary expression grows faster than total value in hours of labour-time i.e. MELT rises — the value of money in terms of labour-time falls.<sup>5)</sup>

### 3. Two TSSI Perspectives on Produced Values and the Determination of MELT.

Andrew Kliman and Alan Freeman usually employ abstract models with-

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5) Intriguingly Hayek (see Desai, 1995) argues that to preserve the value of money prices must fall by the rate of technological progress.



out stocks of unsold commodities or fixed capital to illustrate the TSSI of Marx.<sup>6)</sup> Such pure circulating capital models are sufficient to fully deal with issues such as the FMT, the ‘so-called transformation problem’ and the tendency for the profit rate to fall. By abstracting from stocks Kliman and Freeman can focus on these issues without having to be side-tracked into the separate question of how their approaches to valuation differ if stocks are present.

So to focus on explaining how their approaches differ if stocks of commodities are taken forward from one period to the next let us likewise construct as simple as possible economy to illustrate this difference. Let us assume the economy has a single sector producing a single commodity with no input other than living labour (L). We have for simplicity abstractly assumed away any constant capital, either circulating or fixed. We assume a stock of our single commodity (U) is carried forward from the last period to the start of our current period. Production now occurs in our current period, producing an output of our single commodity (Q). But what would the unit value of our single commodity be in terms of labour-time and how do we calculate MELT?

Let us first explore Kliman’s approach to stock valuation, indeed valuation in general. When considering Marx’s example of a rise in price of cotton (Marx, 1976: 317-318) Kliman (1999: 105) states, followed by Kliman (2007: 21),

It is clear that, because values are determined by current production conditions, when the value transferred to newly produced yarn rises, so must the value transferred to existing stocks of yarn.

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6) Below I shall suggest that fixed capital raises similar questions/differences between Freeman and Kliman as inclusion of stocks of unsold commodities does.

The phrase “currently needed to produce” reflects the idea that the value of newly-produced items determines the value of already-existing ones. If wheat harvested last year had a value of \$4/bushel, while wheat harvested today has a value of £3/bushel, then any wheat that remains from last year likewise has a value of \$3/bushel today.

So for Kliman the relevant commodities to include in the determination of commodities values and the calculation of MELT are newly produced commodities, not stocks of previously produced commodities. Note when we denote a variable as applying to the current period or the previous period let us simply use the subscript c or p. In our simple example for Kliman the unit produced value of our single commodity at the end of production in the current period in terms of hours of labour-time would equal,

$$(1K) \quad v_c = L/Q$$

As there is no other commodity in our abstract one commodity model this produced value must also equal our commodity’s appropriated value, given in hours of labour-time by,

$$(2K) \quad P_c(\text{hours}) = P_c/MELT_c$$

As  $P_c(\text{hours}) = v_c$ , substituting (2K) into (1K),  $P_c/MELT_c = L/Q$ , so,

$$(3K) \quad MELT_c = P_c Q/L$$

Kliman (2007, page 39) defines MELT as the ‘economy-wide ratio of the total money price of output to the total labour-time value of output.’, which simply is  $P_c Q/L$  at the end of production in the current period in our abstract

model with no constant capital. If we did include circulating constant capital (in monetary expression  $c\mathcal{L}$  equal to  $P_p$  times the number of units of constant capital) MELT would equal,

$$(4K) \quad MELT_c = P_c Q / (L + c\mathcal{L} / MELT_p)$$

So Kliman's definition of MELT does 'usually' require us to know last period's MELT, even if this is not so in our abstract special case.<sup>7)</sup>

Carried forward stocks of our single commodity from the previous period would have,  $P_p U$  value (in monetary expression) at the start of the current period, to be replaced by  $v_c U$  value (in hours of labour-time) at the end of the current period. In our one commodity model  $P_p / MELT_p = v_p$ , so  $P_p U / MELT_p = v_p U$ .

If  $v_c \neq v_p$  we can clearly see that stocks have to be re-valued. The total value of current output and carried over stocks from last period at the end of the current period equals  $v_c Q + v_c U$ , which, as  $v_c Q = L$ , is simply  $L + v_c U$ . Potential stock revaluation ensures that the total value of current output and stocks at the end of the current period does not equal the value of stocks at the start of the period plus the living labour applied in production in that period.<sup>8)</sup>

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7) Also normally as we want to calculate the profit rate we need to consider workers' wages, usually in TSSI models assumed to be paid at the start of the period, with their value in labour-time equalling the wage in monetary expression divided by  $MELT_p$ . But neither commodities values nor MELT depend on the distribution of  $L$  between surplus-value and variable capital, so we do not need to consider wages in our deliberately simplified abstract model.

8) So if like Kliman we interpret that Marx considered commodities' values as being

$$(5K) \quad v_c(Q+U) \neq L+v_pU, \quad \text{unless } v_c=v_p$$

However Kliman's method does ensure, is based on the concept that, the value of newly produced commodities is determined by the labour-time actually expended in their production, in our simple model  $L$ , and more generally the used up constant capital plus the living labour applied.

$$(6K) \quad v_cQ=L$$

Let us now consider Freeman's different treatment of stocks of commodities, Freeman (1996: 255-256), note Freeman misses 10 units of stock from his example, my corrections are in square brackets,

Production begins with a definite quantity of each commodity possessing a definite value. ... Total use value is the initial stock less what was consumed plus what was produced; while its exchange value is the initial stock less what was consumed, plus value transferred in production, plus the value product. Dividing the second by the first gives the new market value of the commodity, arising from the two sources of existing stocks and new product. ... As before, there is a contradiction between the output and input values of  $C_T$ . The 50 units of output have an individual value given, as usual, by the sum of metamorphosed inputs (1400) and value product (300). Their unit individual value is therefore  $1700 / 50 = 34$ . If it were not for the 35 [45] units of preserved stocks of  $C_T$ , this would be the market value. But these preserved stocks also

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determined solely by the values of newly produced commodities we must accept that stock revaluation changes the value of total capital, but we cannot really imagine that this is a creation or destruction of value by some source of value other than labour. It is simply a change in the value of commodities that are not participating in the formation of values as determined by current production conditions.

contain the value with which they started, namely 1400 [1800], corresponding to the old unit value of 40. There is only one coherent way to resolve this contradiction, which is to estimate the new market (social) value of  $C_I$  as the average of the whole value contained in the whole stock of  $C_I$ :

For Freeman it is thus all commodities, newly produced plus existing stocks that take part in the determination of commodities' values and the calculation of MELT. In the context of our simple model we now calculate the unit produced value of our single commodity at the end of the current period in hours of labour-time as,

$$v_c = (L + P_p U / MEL T_p) / (Q + U)$$

Which given with one commodity  $P_p / MEL T_p = v_p$  equals,

$$(1F) \quad v_c = (L + v_p U) / (Q + U)$$

We carry the start period value of stocks through to the end of the period to determine, with living labour performed in the current period, the total produced value of currently produced output and carried over stocks. Our single commodity's unit produced value at the end of the current period is simply this total value divided by the number of newly produced units of our single commodity plus carried over stocks of our single commodity from the last period. Our one commodities' appropriated value in hours of labour-time, which must equal its produced value as we only have one commodity, is again given by its price divided by MELT,

$$(2F) \quad P_c(hours) = P_c / MEL T_c$$

Turning to MELT, for Freeman MELT is defined as the total price of capital divided by the total produced value of that capital, which in our model equals the monetary expression of current output plus carried over stocks divided by the produced value of that output and carried over stocks in hours of labour-time,

$$MELT_c = P_c(Q + U) / (L + P_p U / MELT_p)$$

Given with one commodity  $P_p / MELT_p = v_p$ ,

$$(3F) \quad MELT_c = P_c(Q + U) / (L + v_p U)$$

If we also included circulating constant capital Freeman's MELT would be given by,

$$(4F) \quad MELT_c = P_c(Q + U) / (L + c\$/MELT_p + P_p U / MELT_p)$$

We have a clear difference between Freeman's approach and Kliman's approach to valuation in the presence of stocks, ensuring there is a clear difference in how they calculate MELT. Freeman's approach ensures that the total value of stocks and currently produced output at the end of the current period is precisely the living labour applied in that period above the value of stocks at the start of the period.

$$(5F) \quad v_c(Q + U) = L + v_p U$$

However if  $v_c \neq v_p$  the current period's output will not embody the living labour worked in that period.

Table 1. Comparing Kliman And Freeman In A Model With Stocks

$P_p$	MELT <sub>p</sub>	U	$v_p$	$v_p U$	L	$L+v_p U$	Q	$P_c$
(£)	(£ per h)	(use-value)	(hours)	(hours)	(hours)	(hours)	(use-value)	(£)
4	1	5	4	20	60	80	20	4
For Kliman								
1K	2K	3K	5K	6K				
$v_c = L/Q$	$P_c/MELT_c$	$MELT_c = P_c Q/L$	$v_c(Q+U) \neq L+v_p U$ unless $v_c=v_p$	$v_c Q = L$				
(hours)	(hours)	(£ per hour)	(hours)	(hours)				
3	3	$1\frac{1}{3}$	75	60				
For Freeman								
1F	2F	3F	5F	6F				
$v_c = (L+v_p U)/(Q+U)$	$P_c/MELT_c$	$MELT_c = P_c(Q+U)/(L+v_p U)$	$v_c(Q+U) = L+v_p U$	$v_c Q = [(L+v_p U)/(Q+U)]Q \neq L$ unless $v_c = v_p$				
(hours)	(hours)	(£ per hour)	(hours)	(hours)				
3.2	3.2	1.25	80	64				

$$(6F) \quad v_c Q = [(L + v_p U) / (Q + U)] Q \neq L \quad \text{unless } v_c = v_p,$$

To further illustrate the two approaches let us consider a numerical example, see Table 1. For Kliman the total produced value of output does equal the value added by living labour (6K), however the total produced value of output plus stocks after production does not equal the total value of stocks before production plus the value added by living labour in production (5K). Alternatively for Freeman the total produced value of output does not equal the value added by living labour (6F), but the total produced value of assets (output plus stocks) after production does equal the total value of assets before production (stocks) plus the value added by living labour in production (5F). Holding price constant at £4 increased MELT, by 33.3% for Kliman (3K) and by 25% for Freeman (3F).

If we assumed an absence of technological change,  $v_c = v_p$ , the difference between approaches would be hidden; both would satisfy  $v_c Q = L$  and  $v_c (Q + U) = L + v_p U$ , all values and MELT would be exactly the same. But as soon as  $v_c \neq v_p$  the approaches diverge through their different methods of valuation in the presence of stocks.

More generally, if we included constant capital, the produced value of newly produced output will always equal the constant capital transferred and the living labour added in the production of this output if we follow Kliman's interpretation, but, if productivity changes and stocks are carried into the period, it will not if we follow Freeman's interpretation.

If we include circulating constant capital, following Freeman's approach the total produced value of assets (output plus stocks) after production will always equal the total value of assets before production (stocks plus constant capital) plus the value added by living labour in production, but it will not if productivity changes and stocks are carried into the period if we follow Kliman's approach. Furthermore, recognising that capitalists advance varia-



ble capital, the value of total capital at the end of production (output plus stocks) will by Freeman's approach always exceed the total value of capital advanced at the start of production (stocks, plus variable and constant capital) by the total surplus-value extracted from living labour in production, whereas, if productivity changes and stocks are carried into the period, it will not if we follow Kliman's approach.

If we included fixed constant capital, fixed capital applied but not used up in that period (remaining units of fixed capital) would, by Kliman's interpretation, need to be re-valued to reflect the value of newly produced units of fixed capital. Only new units of fixed capital, along with the other newly produced commodities, would be included in our calculation of MELT. In contrast, following Freeman's interpretation, the value of fixed capital would depend not only on the value of newly produced units of fixed capital, but on the value of remaining units of fixed capital as well. We would include remaining units of fixed capital as part of total capital in our calculation of MELT. Note, to fully illustrate in an example how the approaches differ if we include fixed capital is, for reasons of space, beyond the scope of this article.

Now that I have hopefully explained the difference between Kliman's and Freeman's approaches to valuation let us ask ourselves which of these methods might best represent Marx's own method?

When introducing Kliman's method above we can see in the first quote (Kliman, 1999: 105) how Kliman is interpreting how to value stocks from Marx's example of a rise in price of cotton (Marx, 1976: 317-318). Kliman's approach is thus clearly his interpretation of Marx's own approach. In personal correspondence Kliman has made this clear to me, pointing to Marx (1973: 444-447) as further evidence, and noting how the equality of total price/appropriated value and total produced value in Marx's transformation process (Marx, 1976: Chapter 9) applies to the year's production i.e. output,

not pre-existing assets/commodities.

Turning to Freeman's interpretation, the following quote from Freeman (1996: 255), which appears just before the quote we use above to introduce Freeman's valuation method, is very instructive (note for brevity I have not quoted all of the passage from Marx, 1976, page 954, just the first and last sentences),

The calculation of all value magnitudes has to be modified to take into account, in a rigorous manner, the modification of previously-existing values by both price and value changes after they have been produced. This is a natural extension of Marx's method for calculating social or market values from individual values: "The individual commodity does not only appear materially as a part of the total produce of capital, but as an aliquot part of the total produced by it. ... When *determining the price* of an individual article it appears as a merely ideal fraction of the total product in which the capital reproduces itself. (Marx 1976a: 954)" Once a unified market is established, value and price emerge as an average over all the output of society. Marx concentrated his attention on the relation between individual producers and this market value. But everything he wrote logically applies to the entire stock of society; it would not make sense to exclude any portion of this on the basis of an arbitrary accounting separation which adjudges it an output of the "last period" and therefore ineligible to take part.

As I interpret it Freeman is saying Marx's valuation method is applying to the aggregate level of total output, and that he, Freeman, is logically extending this to all of total capital i.e. output plus stocks. So he is not claiming his method is Marx's own method, but that his method is in the spirit of Marx's method.<sup>9)</sup>

Both interpretations are consistent theories of value that satisfy Marx's

key conclusions, such as generally fulfilling the FMT, and the tendency for the rate of profit to fall in response to labour-saving technological change. So although I employ Kliman's approach in my work, believing it to best represent Marx's approach, I would not suggest that Freeman's approach is not somehow within the TSSI of Marx. The main aim of this paper is precisely to argue that research within the TSSI is both necessary and exciting i.e. the TSSI is not a narrow dogma.

#### 4. Commodity Money Stocks.

Let us introduce a commodity money to a simple example based on our model above, but now, as they are no longer the focus of analysis, minus stocks of unsold commodities, except money stocks. We can now explore how Freeman's and Kliman's approaches to valuation suggest we should treat such stocks of commodity money.<sup>10)</sup>

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- 9) Freeman has recently confirmed in correspondence with me that this is his position; so we can rule out the possibility that Freeman sees Kliman's method as an advance he now follows.
- 10) Note my focus here is to explore Kliman's and Freeman's approaches to valuation and not to take a 'definite' position on how Marx thought commodity money functioned. Marx usually, as I interpret it to simplify his analysis, assumes a commodity money with a fixed value i.e. the question of a variable value of money is not the focus of his analysis. Unusually noting the possibility of a variable value of money Marx (1981: 236-237) writes 'If the price of gold is now halved or doubled, in the first case the same capital that was previously worth £100 is now worth £200, and the profit has a value of £40 instead of £20 (i.e. it is expressed in this new amount of money). In the second case, the capital falls to a value of £50, and the profit is now expressed in a product valued at £10. ... There would be no real change in the capital value in any case such as this, but simply a change in the monetary expression of the same value and surplus-value.' So although 'money has no

We now assume our economy has two sectors, each producing a single commodity with no input other than living labour i.e. with no constant capital, either circulating or fixed. One sector produces the commodity both capitalists and workers consume. Let output of this commodity, with  $L$  living labour being applied, be  $Q$  units, priced at  $P$ , with none of this commodity being carried forward as stocks from period to period. Its produced value in labour-time is given by  $v_c = L/Q$  whether we follow Freeman's method (as there are no stocks of this commodity) or Kliman's method (which only considers new output anyway). Our second commodity is gold, in units of ounces, which is a commodity money that once produced simply increases the stock of commodity money. Let  $O_s$  be the units of gold carried into the current period from the past period, with  $O_n$  being the new units of gold produced this period with  $L_g$  living labour. Let  $P_g$  be the price of an ounce of gold in nominal units of money £.

Now we have two commodities the produced and appropriated value of each commodity may differ within the overall constraint that total appropriated value equals total produced value (of total newly produced output for Kliman and for total capital for Freeman).

Following Kliman's approach,

$$v_c = L/Q \quad \text{and} \quad v_{g_c} = L_g/O_n$$

The total produced value of newly produced output this period equals  $L + L_g$ , with its appropriated value in monetary expression equalling

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price' (Marx, 1976: 189) commodities are being priced in £'s (we cannot express the price of a £ in £'s) and not directly by weight in gold, explaining why we can speak of a price of a gold commodity money. Finally, when Marx (1981) analyses the credit system at a concrete level he clearly recognises the possibility of substantial price variations, i.e. variations in the value of money, over the cycle.

$P_cQ + P_{g_c}On$ , so,

$$(7K) \quad MELT_c = (P_cQ + P_{g_c}On) / (L + Lg)$$

The appropriated value of Q equals  $P_cQ / MELT_c$ , and the appropriated value of new units of gold equals  $P_{g_c}On / MELT_c$ , with,

$$P_cQ / MELT_c + P_{g_c}On / MELT_c = L + Lg$$

Following Kliman's approach the total appropriated value of new output equals the total produced value of that output.

Existing money stocks at the end of the last period ( $Os_p + On_p$  becoming  $Os$  for the current period) would have had unit produced value  $vg_p$  and unit appropriated value  $P_{g_p} / MELT_p$  in labour-time, with this appropriated value being their unit value at the start of the current period. Now at the end of the current period these stocks will have unit produced value of  $vg_c = Lg / On$  and unit appropriated value in labour-time of  $P_{g_c} / MELT_c$  i.e. the values of a newly produced unit of gold. These carried over stocks are thus subject to re-valuation at the end of the current period if the appropriated value of an ounce of gold has changed since the end of the last period.

Let us now apply Freeman's approach to our simple model. The key difference we wish to focus on is that for Freeman commodity money stocks, like stocks of other commodities, affect his calculation of MELT. So  $MELT_c$  is calculated by the monetary expression of total capital, in our example  $P_cQ$  plus  $P_{g_c}$  times all units of gold, new and carried forward, divided by the living labour used to produce new units of both commodities plus the value existing units of money stocks carried forward into the current period.

$$(7F) \quad MELT_c = (P_cQ + P_{g_c}On + P_{g_c}Os) / (L + Lg + P_{g_p}Os / MELT_p)$$

As we assume no stocks of our other commodity  $v_c = L/Q$  still holds for Freeman, but the produced value of an ounce of gold is for Freeman given by,

$$vg_c = (Lg + Pg_p Os / MELT_p) / (On + Os)$$

In our previous one commodity example we focused on how technological change,  $v_c \neq v_p$ , effected the value of stocks and newly produced commodities, abstracting from the possibility that appropriated values could deviate from produced values by only assuming one commodity. Thus in our new example, now it is possible to do so through assuming two commodities, we wish to focus on how deviations of appropriated values from produced values at the end of the current period affect values when money stocks are present. Thus in our scenarios described below in Table 2 we set  $Pg_p Os / MELT_p$  such  $(2 \times 30/1)$  that for both Kliman and Freeman  $vg_c = 2$  hours; both commodities' produced values are the same for both Kliman and Freeman. For all our scenarios we set  $Q = 20$ ,  $L = 60$ ,  $Os = 30$ ,  $On = 10$ , and  $Lg = 20$ .

For Kliman, firstly with  $P_c = £4$  and  $Pg_c = £2$  prices are such to 'transfer' 4 hours of value from the value of newly produced units of gold to the value of newly produced units of our other commodity, within the overall constraint of the total appropriated value of newly produced output,  $(P_c Q + Pg_c On) / MELT_c$ , equalling its total produced value,  $(L + Lg)$ .  $Os$  carried forward money stocks, with at the start of the period  $Pg_p Os / MELT_p = 60$  hours of value, are now revalued to  $Pg_c Os / MELT_c = 48$  hours i.e. they lose 12 hours of value. Just as when we considered commodity stocks above revaluation can cause value to 'disappear', but this time not through technological change, rather through a change to the value of commodity money stocks resulting from a change to nominal prices (a deeply non-neutral result for money).

Table 2. Comparing Kliman And Freeman With Commodity Money Stocks

Os (Ounces)	$P_{gOs}/$ $MELT_p$ (hours)	$L_g$ (hours)	On (Ounces)	$vg_c$ (hours)	L (hours)	Q (u-v)	$v_c$ (hours)	$L_g+L$ (hours)	$L_g+L+P_{gOs}/$ $MELT_p$ (hours)
30	60	20	10	2	60	20	3	80	140
Following Kliman's method and assuming $P_c=\pounds 4$ and $P_{g_c}=\pounds 2$									
$P_{g_cOn}$ (£)	$P_cQ$ (£)	7K $MELT_c$ (£ per h)	$P_{g_c}/$ $MELT_c$ (hours)	$P_c/$ $MELT_c$ (hours)	$P_{g_cOn}/$ $MELT_c$ (hours)	$P_cQ/$ $MELT_c$ (hours)	$(P_{g_cOn}+P_cQ)/$ $MELT_c$ (hours)	VT to or from Q (hours)	$P_{g_cOs}/$ $MELT_c$ (hours)
20	80	1.25	1.6	3.2	16	64	80	4	48
Following Kliman's method and assuming $P_c=\pounds 4$ and $P_{g_c}=\pounds 3$									
$P_{g_cOn}$ (£)	$P_cQ$ (£)	7K $MELT_c$ (£ per h)	$P_{g_c}/$ $MELT_c$ (hours)	$P_c/$ $MELT_c$ (hours)	$P_{g_cOn}/$ $MELT_c$ (hours)	$P_cQ/$ $MELT_c$ (hours)	$(P_{g_cOn}+P_cQ)/$ $MELT_c$ (hours)	VT to or from Q (hours)	$P_{g_cOs}/$ $MELT_c$ (hours)
30	80	1.375	2.182	2.909	21.82	58.18	80	-1.82	65.45
Following Freeman's method and assuming $P_c=\pounds 4$ and $P_{g_c}=\pounds 2$									
$P_{g_cOs}+P_{g_cOn}$ (£)	$P_cQ$ (£)	7F $MELT_c$ (£ per h)	$P_{g_c}/$ $MELT_c$ (hours)	$P_c/$ $MELT_c$ (hours)	$P_{g_c}(On+Os)/$ $MELT_c$ (hours)	$P_cQ/$ $MELT_c$ (hours)	$(P_{g_c}(On+Os)+P_cQ)/$ $MELT_c$ (hours)	VT to or from Q (hours)	VT to or from Q (hours)
80	80	1.143	1.75	3.5	70	70	140	10	10
Following Freeman's method and assuming $P_c=\pounds 4$ and $P_{g_c}=\pounds 3$									
$P_{g_cOs}+P_{g_cOn}$ (£)	$P_cQ$ (£)	7F $MELT_c$ (£ per h)	$P_{g_c}/$ $MELT_c$ (hours)	$P_c/$ $MELT_c$ (hours)	$P_{g_c}(On+Os)/$ $MELT_c$ (hours)	$P_cQ/$ $MELT_c$ (hours)	$(P_{g_c}(On+Os)+P_cQ)/$ $MELT_c$ (hours)	VT to or from Q (hours)	VT to or from Q (hours)
120	80	1.429	2.1	2.8	84	56	140	-4	-4

Secondly for Kliman we again set  $P_c = £4$ , but now set  $P_{g_c} = £3$ , while keeping all other variables unchanged. Now prices ‘transfer’ 1.82 hours of value to the value of newly produced units of gold from the value of newly produced units of our other commodity, still within the overall constraint of the total appropriated value of newly produced output equalling its total produced value. Os carried forward money stocks, still with 60 hours of value at the start of the period, are now revalued to 65.45 hours, they gain 5.45 hours of value. So following Kliman’s approach revaluation of stocks can cause value to ‘appear’, but this time not through technological regress (affecting the value of unsold stocks of commodities), but through a change to the value of commodity money stocks caused by nominal price changes (again a deeply non-neutral result for money).

Let us turn to Freeman’s approach. When  $P_c = £4$  and  $P_{g_c} = £2$  the situation is similar to that for Kliman, MELT rises to £1.143 per hour (less than Kliman’s £1.25), appropriated values diverge from produced values in the same direction. However the value transfer is different, it’s a transfer of 10 hours from money stocks, old and new, to our other commodity, as opposed to a transfer of 4 hours from new units of money stocks to our other commodity, with existing money stocks simply losing 12 hours. So value is not ‘lost’, as for Freeman it is the total appropriated value of capital, including stocks,  $(P_c Q + P_{g_c} O_n + P_{g_c} O_s) / MELT_c$ , which must equal the total produced value of that capital,  $L + L_g + P_{g_p} O_s / MELT_p$ .

Let us now turn the value transfer round the other way, as we did for Kliman, by setting  $P_c = £4$  and  $P_{g_c} = £3$ . Whereas for Kliman these prices ensured a transfer of 1.82 hours of value to the value of newly produced units of gold from the value of newly produced units of the other commodity, and Os gained from nowhere 5.45 hours of value, following Freeman’s approach ensures money stocks, new plus old, receive a transfer of 4 hours from our other commodity. MELT now rises by a little more to £1.429 per



hour, as opposed to £1.375 for Kliman. Again the effects are in the same direction, but are of a different magnitude.

So in summary Freeman's method avoids carried forward money stocks appearing to gain or lose value, unless this value is transferred from/to the other commodity in our model. However it does not ensure, like Kliman's approach does, that the value of newly produced commodities equals the labour-time that went into producing those commodities. For example in the scenario with  $P_c = £4$  and  $P_{g_c} = £3$ , for Freeman,

$$(P_c Q + P_{g_c} O_n) / MEL T_c \neq (L + L_g)$$

$$(4 \times 20 + 3 \times 10) / 1.429 = 110 / 1.429 = 77 \neq (60 + 20) = 80$$

But for Kliman,

$$(P_c Q + P_{g_c} O_n) / MEL T_c = (L + L_g)$$

$$(4 \times 20 + 3 \times 10) / 1.375 = 110 / 1.375 = 80 = (60 + 20) = 80$$

## 5. Conclusion

More than anything else I hope my article has shown you how much remains to be done to explore the TSSI of Marx and its concept of the MELT. I am personally exploring how to model circulation alongside production and encountering a new set of questions, including how to calculate MELT (for example do we use producer prices or retail prices). It is only by exploring an approach in good faith that we can hope to appreciate all that it has to offer, and given the TSSI of Marx brings back the consistency of Marx's value theory, what crucially Marx can offer us at this time of 'economic' need.

So finally turning to the bigger picture, rediscovering Marx's consistent

theory of value, including crucially how MELT takes us beyond conventional ‘physicalist’ concepts of value, helps us to understand how the slow-down of the world economy since the end of the Golden Age results from the persistence of low profitability since that time (as statistically demonstrated for the U.S.A. by Kliman, 2012). We can see how the 2007/8 financial crisis is rooted in the tendential behaviour, i.e. low profitability, of the productive economy (Freeman, 2009 and 2016, Potts, 2011b and Kliman, 2012). We can understand that rather than acting ‘too prudently’ politicians and Central Bankers have in fact favoured credit creation over sharp recession since the 1970’s, preventing enough crisis/destruction of capital to decisively boost the rate of profit and restore the system to strong growth (Kliman, 2012). So the question becomes, was our recent crisis severe enough to now restore strong growth, or are we stuck in a Keynesian inspired state of ‘inflationary’ stagnation (Potts, 2013).

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## □ 국문초록

### 노동시간의 화폐적 표현에 대한 마르크스의 시점 간 단일체계 해석의 두 가지 계산

닉 포츠

마르크스에 대한 시점 간 단일체계 해석(TSSI)을 다루는 논문들은 너무 자주 마르크스에 대한 이 해석을, 이 해석이 가격과 가치가 동시에 결정되는 주류 경제학 방법론에서 영향받은 ‘마르크스주의’적 접근과 다르다는 그럴듯한 근거로에 기반, 간단히 무시하려고 한다. 그러나 이 해석은 마르크스의 가치론을 그것이 비정합적이며 군더더기라는 잘못된 주장으로부터 자유롭게 해주었다. 슬프게도 TSSI의 비판자들이 그 지지자들보다 수적으로 우세하기 때문에 대부분의 저널들은 TSSI를 지지하는 논문이 TSSI 비판자들의 의제에 따라야 한다고 주장한다. 이러한 ‘비논쟁’(non-debate)은 TSSI를 검토하는 것을 가로 막는다. 포츠(Potts, 2011a)에서 나는 클라이먼(Kliman)과 프리먼(Freeman) 사이에 상품 재고가 존재할 경우 상품의 가치를 측정하는 방법에 차이가 있음을 처음으로 지적했다. 나는 이 논문에서 이러한 차이는 TSSI를 지지하는 마르크스에 대한 연구가 어떤 특정한 도그마를 따르는 것이 아니라, 마르크스의 자본주의 분석을 오늘날의 세계를 이해하는 데 적용하는 방법에 있어 흥미롭고 열린 태도라는 것을 보여주는 것이라고 결론지었다. 전자 저널 *Critique of Political Economy*에 실린 포츠(Potts, 2011a)는 널리 알려지지 않았는데, 이는 슬프게도 저널이 첫 호 이후 더 이상 출간되지 않았기 때문이다. 그래서 이 논문에서는 나의 분석을 반복하면서 프리먼과 클라이먼의 상이한 방법이 어떻게 노동시간의 화폐적 표현(MELT)의 상이한 계산을 결과시키는지에 초점을 맞출 것이다.

주요 용어: 마르크스, 가치론, TSSI, MELT, 재고.